

BASIC PLAN

PREFACE

The primary mission of government in an emergency is to protect the lives and property of its citizens. Regardless of how well state and federal governments are organized to provide assistance, the unpredictable nature of hurricanes and the time and space factors involved dictate that local jurisdictions must be prepared to cope with the initial impacts of a hurricane. Recognizing that routine emergency service resources may be inadequate to manage the effects of a hurricane, it is the duty of local government to provide for the emergency expansion of its survival capabilities within the limits of available resources.

The Commonwealth of Virginia Hurricane Response Plan, Volume V, is a hazard-specific incident annex to the Commonwealth of Virginia Emergency Operations Plan (*COVEOP*). It has been developed to provide a sound basis for hurricane-oriented emergency preparedness and to establish the organizational framework and operational concepts and procedures designed to minimize the loss of life and property and to expedite the restoration of essential services following a tropical storm or hurricane.

In the preparation of this plan, emergency duties and responsibilities have been assigned to agencies in coordination with the *COVEOP*. Agencies are required to develop detailed Standard Operating Procedures (*SOPs*) detailing what tasks need to be performed and how they will be accomplished in an emergency situation.

The state government organizational staff for emergency operations is referred to as the Virginia Emergency Response Team (*VERT*). The *VERT* consists of personnel from the Department of Military Affairs (*DMA*), Virginia Department of Transportation (*VDOT*), Department of State Police (*VSP*), Virginia Department of Emergency Management (*VDEM*), and other state agencies, volunteer and private organizations as needed. On behalf of the Governor, the State Coordinator or his/her designee, will coordinate operations at the state level. State and local plans anticipate that the state role will be to assist and to supplement local preparedness and response activities, primarily in response to local requests for assistance.

Virginia has grouped and identified the state emergency response agencies into seventeen (17) Emergency Support Functions (*ESF*) that parallel Federal Emergency Support Functions. This grouping will permit functional operational response by state agencies to a large-scale or catastrophic event with the least possible disconnects with similar federal activities. The Virginia Emergency Operations Center (*VEOC*) will be responsible for the coordination of the state effort. Virginia state agencies will, upon notification by the *VEOC*, organize into appropriate *ESF*'s under the State Coordinating Officer (*SCO*) or his/her deputy.

This incident annex has been developed in consonance with cited references and authorities. Specific details and background from these sources are usually referenced rather than included. Agencies using this annex should be familiar with the provisions of the Emergency Services and Disaster Laws, as amended and other volumes of the *COVEOP*, as well as this annex.

Being prepared to recover from the effects of a hurricane requires continual development and revision of emergency procedures, training of staff and auxiliary personnel, and exercises to test this volume of the *COVEOP*. This process and the results of actual emergency response operations will allow refining and distillation of this incident annex to the *COVEOP* and its associated *SOP*'s and supporting plans so that we are as well prepared as possible to cope with hurricane effects.

I. INTRODUCTION

Coastal Virginia is vulnerable to tropical and sub-tropical weather systems. The resulting conditions may require actions and or support of federal and state agencies, and non-governmental organizations.

The effects of a tropical storm or hurricane whose path traverses thru coastal Virginia will impact multiple jurisdictions. A significant tropical weather event in this region will likely impact other Commonwealth regions and neighboring states.

The coastal cities and counties are capable of supporting the response and recovery from moderate tropical storm systems independently or through existing mutual aid agreements. However, a stronger large scale storm event may necessitate declaration of a Local and or State Emergency, and potentially a gubernatorial request for declaration of a Federal Emergency (*pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended, 42 U.S.C. 5121-5207*) to support response and recovery measures.

II. PURPOSE

The purpose of this plan is to provide the framework for the effective and coordinated response of the VEOC, state agencies, hurricane risk localities, and inland localities to a tropical storm or hurricane threatening the Virginia coast. The coordination and successful execution of this plan is critical if evacuation of predetermined storm surge inundation areas is required.

III. AUTHORITY

This plan is under the authority of, and in accordance with, the Commonwealth of Virginia Emergency Services and Disaster Laws; the National Incident Management System; and the National Response Framework (*NFR*). This plan has been prepared in synchronization with relevant plans and programs of the federal and state governments.

IV. ORGANIZATION

The State Hurricane Program Manager, under the direction of the State Coordinator of the VDEM, is responsible for maintenance of this plan.

VDOT is responsible for the development and maintenance of the VDOT Hurricane Lane Reversal Plan, summarized in Annex B-III of this plan for hurricane evacuation traffic control.

It is the responsibility of each local government to develop and maintain emergency response plans and procedures to protect public safety and property. Coastal localities should develop and regularly test and exercise hurricane-specific plans and procedures.

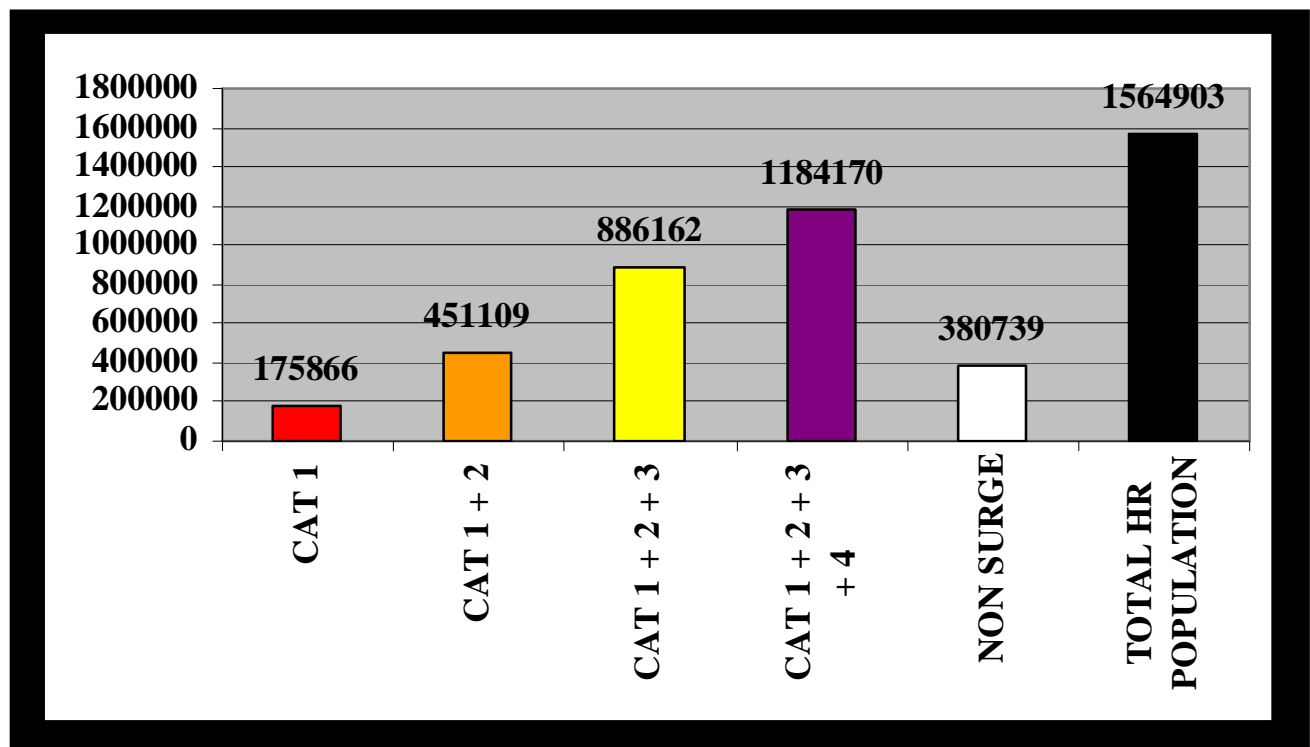
The Governor, acting through the State Coordinator, will coordinate statewide emergency operations and will coordinate with affected jurisdictions to authorize evacuation and other protective actions as necessary.

V. SITUATION & PLANNING ASSUMPTIONS

Virginia is susceptible to all levels of tropical systems, from tropical depressions to severe Category 4 hurricanes. However, historically Category 4 storms have been extremely rare events in Virginia. These tropical systems produce three major hazards:

- Storm Surge
- High Winds & Possible Tornadoes
- Rainfall

- A. The vulnerable population at risk and which should be evacuated in the event of a worst-case Category 4 hurricane is defined, for planning purposes, as those persons along the coast in the pre-identified storm surge inundation areas and any residential structure that may be at risk from hurricane force winds.
- B. The initial stage of an evacuation of the Hampton Roads area is voluntary. Residents and tourists will be informed no later than 48 hours prior to the arrival of sustained tropical storm force winds that a hurricane is forecasted to affect the area, and will be encouraged to evacuate.
- C. The total number of individuals potentially at risk from a life-threatening Category 4 storm is estimated at just fewer than 1.2 million during high tourist season.



- D. Storm effects could also impact other communities further inland due to high winds, localized heavy rains and/or flooding. However, these secondary storm effects are much less predictable. For additional information, see *Appendix I – Hurricane Hazards*.

- E. Pre-disaster warning time will vary; however, the National Weather Service will detect and track a hurricane in time for effective action to be taken in accordance with the provisions of this plan. The VEOC and the Joint Field Office (*JFO*), if operational, will continue to be operable despite the effects of a hurricane. Hurricane effects on the Commonwealth will be approximately as projected in the 2008 Virginia Hurricane Evacuation Study-Transportation Analysis data. Federal agencies and organizations will function in accordance with the National Response Framework (*NRF*). Local and state agencies and organizations will carry out all-hazard decisions and functions as required by locality EOP's, the COVEOP, and this hurricane hazard-specific annex.

VI. ROLES & RESPONSIBILITIES

Local governments should analyze probable effects of a hurricane strike on their ability to carry out routine functions of government, such as law enforcement, fire protection, emergency medical service, water and wastewater service, etc. Shortfalls noted by this analysis should be identified, and the extent and type of resource limitations should be predetermined. (*Examples: (1) generators to keep water and sewer lines working and (2) security personnel to deny access to damaged areas until it is safe for residents to return.*)

Local governments should take appropriate action to declare a local emergency as authorized by the Code of Virginia, in a timely manner so as to implement emergency operations to protect the health and safety of persons and property. This authority confers essentially the same authority locally upon a governing body, as does the declaration of a "state of emergency" from the Governor. When supported by local ordinances, this local authority includes the authority to declare a curfew, among other stated powers.

- A. The VEOC will maintain storm assessment capability, utilizing the storm tracking computer program "HURREVAC", which was developed for the Federal Emergency Management Agency (*FEMA*) for use by federal, state and local emergency management officials to assist with evacuation decision making. The VEOC will be prepared to assist local jurisdictions in deciding when or if evacuation of their localities is prudent based on storm assessment.
- B. The VDOT has established five regional Transportation Operations Centers (*TOC*). These centers are operated by VDOT personnel and in coordination with the Transportation Emergency Operations Center (*TEOC*). The primary task of these centers will be to facilitate traffic movement in the event of a large-scale evacuation from the coastal areas. Close and direct coordination with local jurisdictions will be maintained (*see Annex B-III VDOT Hurricane Lane Reversal Plan Summary*).
- C. Reporting, warning, notification, and communications will be in accordance with (*see Annex A-I Direction & Control*) of this plan.
- D. Joint Information Center (*JIC*) will be established. The JIC will be staffed and operated in accordance with ESF #15 of the COVEOP.

VII. CONCEPT OF OPERATIONS

This plan establishes, within the general guidance of the COVEOP, the hurricane-specific concepts and policies under which all elements of state government and its political subdivisions will operate; provides for integration of the total resources of the government and the private sector; assigns responsibilities to elements of government, quasi-government, and private entities; and sets forth standard concepts and procedures whereby all local governments can develop compatible hurricane plans and SOP's.

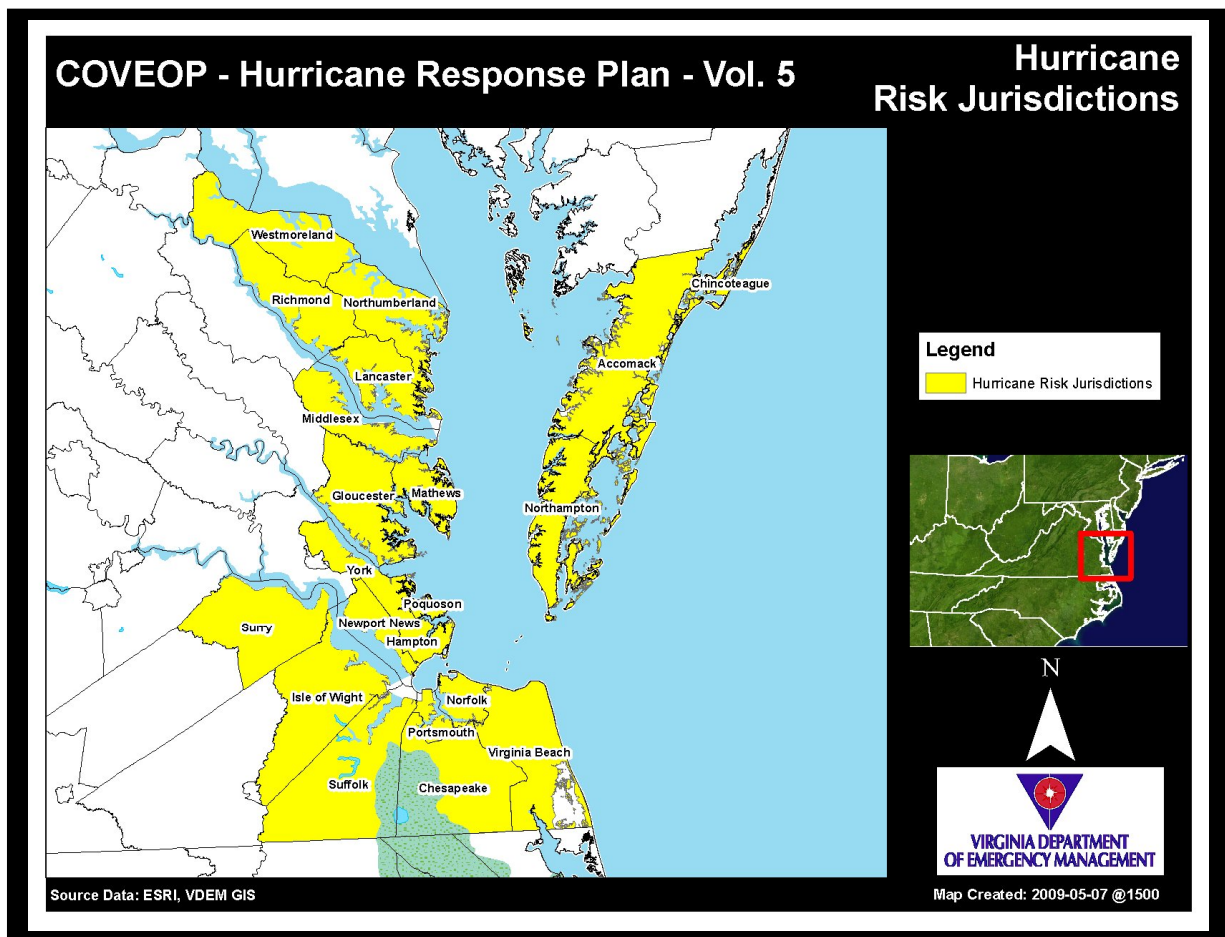
When a hurricane strikes, help may not be immediately available from the state or federal government. Local governments should be prepared to bear the initial responsibility for hurricane response and relief as well as preparation for the arrival of a hurricane. Local plans and procedures prepared should be developed and maintained to provide for the safety and welfare of citizens until such time outside assistance is available.

Concept of Operations – Continued

- A. An effective response to a hurricane emergency is dependent on the development of plans, programs, and procedures, which will provide for:
 - 1) Rapid mobilization and effective utilization of the resources and capabilities of local government and the private sector within the affected area.
 - 2) Effective use of support from other political subdivisions of the state through Statewide Mutual Aid (*SMA*) as well as out of state sources such as the Emergency Management Assistance Compact (*EMAC*).
 - 3) Responsive and effective state and federal emergency and disaster relief assistance.
- B. The mission of Virginia State Government, in coordination with local governments, is to plan and prepare for a hurricane, so as to minimize casualties and property damage and to restore impacted communities to pre-incident condition as soon as possible following a storm.
- C. The mission of local government is to develop plans and prepare for emergency operations related to a hurricane in conformity with this plan, the COVEOP, and the Commonwealth of Virginia Emergency Services and Disaster Laws. All public officials have a legal responsibility to ensure that their jurisdictions are prepared, to the best of their abilities, to cope with any potential disaster. Therefore, the development of emergency response capabilities and the direction and control of local emergency operations when a hurricane strikes are the direct responsibility of local governments.
- D. A general action checklist is included in each functional annex to this plan. Each reflects the common framework of terminology, periods of operation, and protective actions needed for a coordinated federal/state/local response. The VEOC and coastal localities should, using this model, develop more detailed checklists for each function as needed, answering the key questions of who, what, when, and where. These checklists will serve as a guide for actions to be taken as a tropical storm or hurricane approaches. State agencies may also need to prepare such checklists.
- E. In response to a potential disaster, the Department of Homeland Security (*DHS*), FEMA and other federal agencies may, in accordance with the National Response Framework, pre-deploy personnel in order to be in position to provide an immediate disaster response, if needed.
- F. Hurricane preparedness should be undertaken in a systematic, time-phased way. This and other pertinent publications should be periodically reviewed and updated, as necessary; personnel assignments to essential tasks should be updated; and required training (*e.g.*, FEMA Hurricane storm tracking program (*Hurrevac*), National Oceanographic Atmospheric Administration (*NOAA*) Sea Lake and Overland Surges from Hurricanes modeling program (*SLOSH*), weather terminology review should be accomplished. Conditions of readiness of operational and decision-making organizations should be systemized. The Readiness Condition Timeline is recommended as the guide for state agencies and local jurisdictions. Hurricane response plans should include detailed action checklists for each local emergency service organization and for each readiness condition, as appropriate.
- G. Each state agency should designate an Emergency Coordination Officer (*ECO*) to develop and maintain their appropriate disaster preparedness, response, and recovery program in accordance with emergency duties and responsibilities as assigned in the COVEOP. The state agency coordinator is also responsible for maintaining their respective part(s) of the COVEOP.

Concept of Operations – Continued

- H. Each locality, with an emergency management program in accordance with state code, is required by the Virginia Emergency Services and Disaster Laws to designate an emergency management director. The Director, who in turn, usually employs a coordinator and staff as needed to develop and maintain an appropriate local disaster preparedness, response, and recovery program.
- I. The primary hazard to be addressed by the 21 hurricane risk localities (*listed below*) is the impact of storm surge inundation from a tropical storm or hurricane. Coastal localities should develop and maintain a current hurricane response plan, which should be exercised and updated annually. This plan serves to supplement the required local Emergency Operations Plan (*EOP*) and must be compatible with state and federal disaster response plans and procedures.



Designated Hurricane Risk Localities		
Accomack County	Mathews County	Portsmouth City
Chesapeake City	Middlesex County	Richmond County
Chincoteague Town	Newport News City	Suffolk City
Gloucester County	Norfolk City	Surry County
Hampton City	Northampton County	Westmoreland County
Isle of Wight County	Northumberland County	Virginia Beach City
Lancaster County	Poquoson City	York County

Concept of Operations – Continued

- J. This plan is effective for training, pre-emergency preparedness, or execution upon receipt. It is activated upon the declaration of a “State of Emergency” by the Governor for a hurricane or other serious tropical weather system or upon notification of same made by the State Coordinator.
- K. State support to local governments and coordination of emergency operations will be accomplished through the VEOC by the State Coordinator, assisted by selected state agencies. The provision of state assistance does not replace local operational, legal, or financial responsibility and authority for disaster management.
- L. Those officials responsible for implementing this plan are responsible for thoroughly familiarizing themselves and their personnel with its contents and for developing effective procedures for carrying out assigned tasks and functions. Localities and state agencies preparing plans in support of this plan should forward copies to VDEM for review and reference to assure compatibility. The State Coordinator is responsible for maintaining and updating this plan. Responsible officials at all levels of government should recommend improvements and changes, as they deem appropriate to the State Coordinator.

VIII. READINESS CONDITIONS ACTION CHECKLIST

Readiness Condition 5 - Routine Operations

- 1) Condition assumed when not in higher condition of readiness.
- 2) Monitor weather systems for possible development of tropical systems.
- 3) Maintain plans, conduct training and exercises, test emergency communications periodically.

Readiness Condition 4 - Forecast Arrival of Tropical Storm Force Winds 144 to 96 Hours

A tropical weather system has developed which has the potential to impact the Commonwealth within 144-96 hours (*D-6 to D-4 days*).

- 1) Complete any actions not accomplished from Readiness Condition 5.
- 2) Activate the Virginia Evacuation Coordination Team for Operational Response (*VECTOR*) as may be required.
- 3) Begin preparatory actions by identifying stocks of materials, pre-warning emergency services personnel, etc.
- 4) Prepare to receive DHS/FEMA personnel.
- 5) Continue to track the weather system and maintain situational awareness.

Readiness Condition 3 - Forecasted Arrival of Tropical Storm Force Winds 96 to 48 Hours

Tropical storm force winds from a tropical weather system may impact the Commonwealth within 96-48 hours (*D-4 to D-2 days*).

- 1) Complete all actions not accomplished from Readiness Condition 4.
- 2) Begin pre-positioning of State resources (*Virginia State Police, Virginia Department of Transportation, Virginia National Guard, Virginia Department of Social Services, and Virginia Office of Emergency Medical Services*).
- 3) Virginia Evacuation Coordination Team for Operational Response (*VECTOR*) will continue to monitor traffic issues and coordinate the level of evacuations that may be required.
- 4) *VECTOR* will provide evacuation and shelter recommendation(s) to the Governor, to include potential lane reversal option and timing.
- 5) All appropriate agencies and organizations should continue to be informed of the situation. Continue to track the weather system and maintain situational awareness.

Readiness Condition 2 - Forecasted Arrival of Tropical Storm Force Winds 48 to 24 Hours

Tropical storm force winds may impact the Commonwealth within 48-24 hours (*D-2 to D-1 days*).

- 1) Complete all actions not accomplished from Readiness Condition 3.
- 2) Based on Governor's decision, implement evacuation at **D-38 hours** OR lane reversal evacuation at **D-30 hours**, or as otherwise directed, as authorized.
- 3) Monitor status of public sheltering conditions.
- 4) VECTOR will identify worst-case decision points for termination of evacuation and provide information to agencies and jurisdictions.
- 5) Accelerate all preparedness actions for emergency and vital affected services.
- 6) Maintain knowledge of storm track, size, probabilities, and decision point times.
- 7) Recommend agencies and jurisdictions take necessary actions in order to prepare for the threat from the approaching storm and commencement of evacuation at or before decision point.
- 8) Continue to track the weather system and maintain situational awareness.

Readiness Condition 1 - Forecasted Arrival of Tropical Storm Force Winds Within 24 Hours

Tropical storm force winds may impact the Commonwealth within 24 hours (*D-1 day*).

- 1) Complete all actions not performed from Readiness Condition 2.
- 2) Evacuations should be completed prior to the arrival of tropical storm force winds.
- 3) VECTOR will continue to monitor evacuation and sheltering activities and track available Refuges of Last Resort.
- 4) Condition 1 should be maintained through the storm event and until the threat has receded as appropriate.

Following the storm event, response and recovery operations should be undertaken as outlined in the COVEOP. Readiness conditions should be adjusted as necessary and appropriate.

Landfall - Arrival of Tropical Storm Force Winds thru Departure of Tropical Storm Force Winds

Period between the arrival and final departure of tropical storm force winds.

Emergency Relief Phase - Life Saving Operations & Restoration of Essential Services

Life-saving operations and the restoration of essential services. Usually ends when it is safe to allow residents to return to their homes.

IX. HURRICANE EVACUATION STUDY DATA

Accomack County

STORM SURGE					
Maximum Surge Height <i>(in feet)</i> Still Water Elevation					
*Saffir-Simpson Category	Wachapreague <i>(Atlantic Ocean)</i>	Chincoteague <i>(Atlantic Ocean)</i>	VA/MD Line <i>(Chesapeake Bay)</i>	Onancock <i>(Chesapeake Bay)</i>	Tangier Island <i>(Chesapeake Bay)</i>
1	8.2	6.8	5.5	4.2	4.0
2	13.1	10.6	9.5	6.8	6.0
3	18.0	14.4	13.2	9.5	8.1
4	22.0	18.0	16.2	12.0	10.2
Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category					

TOTAL POPULATION – 38,279	
*Saffir-Simpson Category	VULNERABLE POPULATION <i>(Based Upon High Occupancy)</i>
1	14,998
2	21,271
3	25,191
4	27,621
Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category	

SHELTER CAPACITY
13,046

**Detail breakdown of Vulnerable Populations is available in the 2009 Delmarva Hurricane Evacuation Study/Technical Data Report*

Hurricane Evacuation Study Data – Continued

City of Chesapeake

STORM SURGE Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Deep Creek Locks/Bridge (Inter-Coastal Waterway)	Great Bridge Locks/Bridge (Inter-Coastal Waterway)	Route 104 Dominion Bridge (Elizabeth River)	VA/NC Line Ches. Expressway (Northwest River)
1	5.3	5.2	5.2	2.8
2	7.2	7.6	7.6	5.6
3	12.3	12.6	12.6	12.1
4	16.1	16.1	15.9	18.1
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 230,000	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	30,593
2	94,487
3	237,637^
4	237,637^
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	8,519	1,575	+6,944
2	8,519	6,022	+2,497
3	8,519	20,247	-11,728
4	8,519	20,247	-11,728
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

^ Note: Total exceeds permanent population due to seasonal and visitor populations.

Hurricane Evacuation Study Data – Continued

Gloucester County

STORM SURGE Maximum Surge Height (in feet) Still Water Elevation			
*Saffir-Simpson Category	At Severn & Ware Rivers (Mobjack Bay)	Route 17 / 33 Dragon Swamp (Piankatank River)	Corporate Boundary At Poropotank River (York River)
1	8.0	6.9	5.5
2	11.8	11.8	9.2
3	16.3	17.2	12.7
4	20.8	20.5	16.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 38,487	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	2,933
2	5,118
3	6,247
4	7,289
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	2,000	744	+1,256
2	2,000	1,274	+726
3	2,000	1,599	+401
4	2,000	2,174	-174
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

City of Hampton

STORM SURGE Maximum Surge Height (<i>in feet</i>) Still Water Elevation			
*Saffir-Simpson Category	Langley (<i>Back River</i>)	I-64 Hampton Roads B/T (<i>Chesapeake Bay</i>)	Queen Street (<i>Newmarket Creek</i>)
1	6.4	6.3	5.9
2	10.3	10.6	10.4
3	14.2	14.1	14.6
4	17.9	17.6	18.4
Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category			

TOTAL PERMANENT POPULATION – 149,600	
*Saffir-Simpson Category	VULNERABLE POPULATION (<i>Based Upon High Occupancy</i>)
1	65,944
2	92,453
3	120,894
4	155,215 [^]
Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category	

SHELTER CAPACITY vs. SHELTER DEMAND (<i>Based Upon High Occupancy</i>)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	5,889	3,194	+2,695
2	5,889	5,096	+793
3	4,294	7,965	-3,671
4	-0-	13,108	13,108
Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category			

*Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis

[^] Note: Total exceeds permanent population due to seasonal and visitor populations.

Hurricane Evacuation Study Data – Continued

Isle of Wight County

STORM SURGE			
Maximum Surge Height (<i>in feet</i>) Still Water Elevation			
*Saffir-Simpson Category	Route 17 / 258 James River Bridge (<i>James River</i>)	Route 258 / 10 Smithfield (<i>Pagan River/Cypress Creek</i>)	Route 17 Hazelwood Bridge (<i>Chuckatuck Creek</i>)
1	6.6	6.4	5.6
2	10.2	10.5	9.6
3	14.0	15.4	14.0
4	17.4	20.3	16.6
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 33,090	
*Saffir-Simpson Category	VULNERABLE POPULATION (<i>Based Upon High Occupancy</i>)
1	15,780
2	15,780
3	15,780
4	15,780
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND			
(<i>Based Upon High Occupancy</i>)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	1,750	1,165	+585
2	1,750	1,397	+353
3	1,750	1,523	+227
4	1,750	1,758	-18
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

Lancaster County

STORM SURGE			
Maximum Surge Height (in feet) Still Water Elevation			
*Saffir-Simpson Category	Route 3 (Corrotoman River)	Route 3 Norris Bridge (Rappahannock River)	Windmill Point (Chesapeake Bay)
1	5.4	4.6	4.2
2	8.5	7.4	6.7
3	11.6	9.7	9.2
4	14.8	11.5	11.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 12,198	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	820
2	1,178
3	1,439
4	1,754
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	528	189	+339
2	528	318	+210
3	528	407	+121
4	528	588	-60
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

Mathews County

STORM SURGE			
Maximum Surge Height (in feet) Still Water Elevation			
*Saffir-Simpson Category	New Point (Chesapeake Bay)	Route 3 Southside of Twigg Bridge (Piankatank River)	Gwynn Island (Chesapeake Bay)
1	6.5	5.6	4.7
2	10.2	9.2	7.3
3	13.3	12.0	9.8
4	16.7	14.5	12.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 9,500	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	3,335
2	6,144
3	8,723
4	9,494
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	200	140	+60
2	0	320	-320
3	0	579	-579
4	0	712	-712
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

Middlesex County

STORM SURGE Maximum Surge Height (in feet) Still Water Elevation			
*Saffir-Simpson Category	Route 3 Northside of Twigg Bridge (Piankatank River)	Stingray Point (Chesapeake Bay)	Urbana (Rappahannock River)
1	5.6	4.7	4.6
2	9.2	7.3	7.4
3	12.0	9.8	9.7
4	14.5	12.5	11.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 11,498	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	2,327
2	4,365
3	5,431
4	6,918
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	500	179	+321
2	500	360	+140
3	500	497	+3
4	500	793	-293
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

City of Newport News

STORM SURGE			
Maximum Surge Height (in feet) Still Water Elevation			
*Saffir-Simpson Category	I-664 Monitor Merrimac B/T (Hampton Roads Harbor)	Route 17 /258 James River Bridge (James River)	Fort Eustis (James River)
1	6.0	5.5	5.4
2	9.8	9.2	9.0
3	13.4	12.3	12.7
4	17.3	16.3	16.4
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 191,999	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	3,134
2	7,221
3	19,666
4	35,992
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	4,171	1,100	+3,071
2	4,171	2,339	+1,832
3	4,171	4,320	-149
4	4,171	8,447	-4,276
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

City of Norfolk

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Route 460 Granby Street (Lafayette River)	I-64 Hampton Roads B/T (Chesapeake Bay)	Route 58 Midtown Tunnel (Elizabeth River)	I-264 Downtown Tunnel (Elizabeth River)
1	6.4	6.3	5.9	5.6
2	9.9	9.7	9.4	8.4
3	12.5	13.5	12.3	11.7
4	15.4	16.6	15.4	15.3
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 236,339	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	22,816
2	78,056
3	181,570
4	248,520^
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	1,500	1,032	+468
2	1,500	4,830	-3,330
3	1,500	15,212	-13,712
4	1,500	25,178	-23,678
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

^ Note: Total exceeds permanent population due to seasonal and visitor populations.

Hurricane Evacuation Study Data – Continued

Northampton County

STORM SURGE					
Maximum Surge Height (in feet) Still Water Elevation					
*Saffir-Simpson Category	Machipongo (Atlantic Ocean)	Route 13 Ches. Bay B/T (Atlantic Ocean)	Cape Charles (Chesapeake Bay)	Eastville (Chesapeake Bay)	Jamesville (Chesapeake Bay)
1	8.8	7.3	5.0	4.4	4.1
2	15.2	11.4	8.2	7.1	6.5
3	20.8	15.3	11.3	9.7	9.2
4	26.1	18.7	13.9	12.3	11.7
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>					

TOTAL PERMANENT POPULATION – 13,036	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	2,400
2	3,672
3	5,410
4	6,092
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY
6,600

**Detail breakdown of Vulnerable Populations is available in the 2009 Delmarva Hurricane Evacuation Study/Technical Data Report*

Hurricane Evacuation Study Data – Continued

Northumberland County

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Route 200 <i>(Great Wicomico River)</i>	Route 360 <i>(Coan River)</i>	Lewisetta <i>(Potomac River)</i>	Smith Point <i>(Chesapeake Bay)</i>
1	5.9	5.2	4.9	3.9
2	11.3	8.1	7.8	6.0
3	16.0	11.7	10.7	8.3
4	17.1	14.0	13.6	10.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 13,299	
*Saffir-Simpson Category	VULNERABLE POPULATION <i>(Based Upon High Occupancy)</i>
1	859
2	1,388
3	1,736
4	2,246
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND <i>(Based Upon High Occupancy)</i>			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	550	198	+352
2	550	345	+205
3	550	446	+104
4	550	666	-116
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

City of Poquoson

STORM SURGE		
Maximum Surge Height (in feet) Still Water Elevation		
*Saffir-Simpson Category	Chisman Creek (Poquoson River)	Plumtree Island (Chesapeake Bay)
1	7.3	7.0
2	11.7	10.6
3	15.9	14.4
4	19.1	17.8

Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category

TOTAL PERMANENT POPULATION – 12,000	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	7,659
2	12,001^
3	12,001^
4	12,001^

Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
<i>*Due to lack of shelter capacity – Poquoson partner's with York County*</i>			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	0	384	-384
2	0	688	-688
3	0	688	-688
4	0	688	-688

Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

^ Note: Total exceeds permanent population due to seasonal and visitor populations.

Hurricane Evacuation Study Data – Continued

City of Portsmouth

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Route 337 Portsmouth Blvd. (Elizabeth River)	Route 58 Midtown Tunnel (Elizabeth River)	I-264 Downtown Tunnel (Elizabeth River)	Norfolk Naval Shipyard (Elizabeth River)
1	6.6	5.9	5.6	5.5
2	11.1	9.4	8.4	8.1
3	12.2	12.3	11.7	11.8
4	15.3	15.4	15.3	15.4
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 101,376	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	8,185
2	63,589
3	103,245^
4	103,245^
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	980	395	+585
2	980	4,266	-3,286
3	980	8,227	-7,247
4	980	8,227	-7,247
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

^ Note: Total exceeds permanent population due to seasonal and visitor populations.

Hurricane Evacuation Study Data – Continued

Richmond County

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Corporate Boundary @ Westmoreland (Rappahannock River)	Route 3 Totuskey Bridge (Totuskey Creek)	Route 360 Downing Bridge (Rappahannock River)	Route 637 (Cat Point Creek)
1	5.3	4.7	4.7	4.7
2	9.1	7.6	7.7	7.7
3	10.6	9.7	9.7	9.7
4	11.7	11.5	11.5	11.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 9,600	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	161
2	319
3	513
4	776
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	1,450	139	+1,311
2	1,450	242	+1,208
3	1,450	314	+1,136
4	1,450	465	+985
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

City of Suffolk

STORM SURGE			
Maximum Surge Height (in feet) Still Water Elevation			
*Saffir-Simpson Category	Route 460 /10 / 32 North Main Street (Nansemond River)	Route 125 Kings Highway (Nansemond River)	I-664 Monitor Merrimac B/T (Hampton Roads Harbor)
1	6.1	6.0	5.5
2	10.1	10.0	9.0
3	13.6	13.5	12.9
4	15.9	15.9	16.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

TOTAL PERMANENT POPULATION – 89,800	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	2,832
2	24,345
3	36,616
4	36,616
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	7,250	241	+7,009
2	6,250	1,944	+4,306
3	5,000	3,379	+1,621
4	5,000	3,923	+1,077
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

Surry County

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	IoW County Line At Lawnes Creek (James River)	Hog Island (James River)	Scotland At Grays Creek (James River)	Claremont At Chippokes Creek (James River)
1	6.2	4.7	4.1	3.8
2	10.0	7.8	7.2	6.5
3	13.2	11.3	10.9	9.7
4	17.4	15.4	15.1	13.2
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 7,101	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	482
2	482
3	482
4	482
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	1,650	142	+1,508
2	1,650	218	+1,432
3	1,650	261	+1,389
4	1,650	350	+1,300
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

City of Virginia Beach

STORM SURGE					
Maximum Surge Height (in feet) Still Water Elevation					
*Saffir-Simpson Category	Sandbridge (Atlantic Ocean)	Rudee Inlet (Atlantic Ocean)	Fort Story (Chesapeake Bay)	Route 60 Lesner Bridge (Chesapeake Bay)	Route 58 Pembroke Area (Lynnhaven River)
1	6.3	6.3	6.0	6.0	6.0
2	10.4	10.4	9.8	9.9	10.3
3	13.6	13.9	13.2	13.0	11.5
4	17.6	17.8	16.0	16.3	15.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>					

TOTAL PERMANENT POPULATION – 444,800	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	59,315
2	128,183
3	204,462
4	368,575
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	18,000	2,957	+15,043
2	18,000	8,048	+9,952
3	18,000	16,094	+1,906
4	3,500	41,672	-38,172
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

Westmoreland County

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Route 205 <i>(Mattox Creek)</i>	Route 621 <i>(Nomini Creek)</i>	Corporate Boundary At Potomac River <i>(Yeocomico River)</i>	Colonial Beach <i>(Yeocomico River)</i>
1	6.0	5.6	5.1	4.6
2	10.0	9.4	8.3	7.7
3	13.9	13.2	11.0	12.0
4	18.3	16.5	13.9	15.5
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 17,600	
*Saffir-Simpson Category	VULNERABLE POPULATION <i>(Based Upon High Occupancy)</i>
1	1,915
2	2,775
3	4,447
4	6,138
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND <i>(Based Upon High Occupancy)</i>			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	3,364	268	+3,096
2	3,364	446	+2,918
3	3,364	685	+2,679
4	3,364	1,089	+2,275
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

Hurricane Evacuation Study Data – Continued

York County

STORM SURGE				
Maximum Surge Height (in feet) Still Water Elevation				
*Saffir-Simpson Category	Harwood's Mill Reservoir (Poquoson River)	Bennett Creek (Poquoson River)	US Coast Guard Training Center (York River)	Route 17 Coleman Bridge (York River)
1	7.6	7.3	7.3	7.2
2	11.5	11.7	12.0	12.0
3	15.8	15.9	15.7	15.7
4	19.0	19.1	19.3	19.4
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>				

TOTAL PERMANENT POPULATION – 68,800	
*Saffir-Simpson Category	VULNERABLE POPULATION (Based Upon High Occupancy)
1	8,599
2	14,507
3	25,844
4	25,844
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>	

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	3,721	686	+3,035
2	3,721	1,375	+2,346
3	3,721	2,702	+1,019
4	3,721	3,164	+557
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

SHELTER CAPACITY vs. SHELTER DEMAND (Based Upon High Occupancy)			
York County & City of Poquoson Combined			
*Saffir-Simpson Category	Shelter Capacity	Shelter Demand	Shelter Surplus+ or Deficit-
1	3,721	1,070	+2,651
2	3,721	2,063	+1,658
3	3,721	3,390	+331
4	3,721	3,852	-131
<i>*Corresponds approximately to the Saffir-Simpson Hurricane Scale – Wind Speed is the determining factor for assignment of Category*</i>			

**Detail breakdown of Vulnerable Populations is available in the 2008 Virginia Hurricane Evacuation Study/Transportation Analysis*

**Commonwealth of Virginia Emergency Operations Plan
Hurricane Response Plan Volume 5**

X. REFERENCES

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